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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/597,841	08/09/2006	Min-Seok Song	3576-025	6977

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EXAMINER	
PARVINI, PEGAH	
ART UNIT	PAPER NUMBER
1793	
MAIL DATE	DELIVERY MODE
12/03/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/597,841	SONG ET AL.	
	Examiner	Art Unit	
	PEGAH PARVINI	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 August 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *16-24 and 26-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *16-24 and 26-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 August 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

The amendment filed August 11, 2009 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: the specification does not provide support and adequate written description for "the plurality of abrasives" bonded into the "through-hole" as that recited in instant claim 21.

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 21 and 32 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification does not provide support and adequate written description for "the plurality of abrasives" bonded into the "through-hole" as that recited in instant claim 21. Furthermore, the specification does

not provide support for “a top of the upper abrasive layer formed over the surface of the shank is *lower* than a top of the lower abrasive layer" as that recited in new claim 32.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 21 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is not clear as which of the plurality of abrasive particles is meant by the new amendment of claim 21 which is “the plurality of abrasives are bonded into the groove and the through-hole”; in other words, does this plurality of abrasive refers to “plurality of abrasives are bonded into the concave portions" or "another plurality of abrasives are formed over the plurality of abrasives bonded into the concave portions".

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 16, 19, 22 and 30-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. 5,611,326 to Caspani et al.

Caspani teaches a diamond tool which comprises of opening slots (i.e. concave portions) in a support material (i.e. shank) wherein the opening slots are filled with diamond bodies (see figure 3).

Caspani et al., drawn to diamond-set insert carrier tool, clearly teach abrasive bodies in concave shapes which contain abrasive particles and are spaced close to each other on substrate or support (i.e. shank) (Figure 3, Abstract; column 3). Although the reference may not expressly disclose that the ratio of the spacing between the concave portions to the width of the concave portions as being within a range of 0.2 to 0.8, it is apparent from the figures that the width of the concave portions is almost twice than the spacing between the concave portions. Thus, this results in roughly a ratio of about 0.5. This is seen to read on the limitation of instant claims absence clear evidence showing why Caspani et al. may not want to have such a spacing.

Furthermore, the reference clearly discloses that the surface of the support to which the abrasive bodies are applied is shaped as an arc of a circle.

With reference to “another plurality of abrasives are formed over the plurality of abrasives bonded into the concave portions and onto the surface of the shank to form multiple abrasive layers” (previous claim 25), it is to be noted that as clearly shown by Caspani et al., there is not only one layer of abrasives bonding to and filling the concave shapes; therefore, there are layers and pluralities of abrasives bonding to the walls of the slots and to each other, on top of each other, to fill in the concave portions forming the diamond tool. This is specially true since the claims claim "plurality of abrasives are bonded into the concave portions" and "another plurality of abrasives are formed over

the plurality of abrasives..." but does not provide any distinction between these two pluralities of abrasives; therefore, it is the Examiner's position that layers of abrasives (i.e. plurality of abrasives) bonded to each other and to the walls of the slots (i.e. concave portions) on top of each other reads on the new limitation to instant claims.

With reference to the limitations of claims 31 and 32, wherein “a top of the upper abrasive layer formed over the surface of the shank is protruded above a top of the lower abrasive layer” and “a top of abrasive layer formed over the surface of the shank is lower than a tope of the lower abrasive layer”, as detailed out above, there is no distinction seen between the lower and upper abrasive layer (i.e. they are not of two different type of abrasives, etc.); therefore, it is taken that a layer or more is/are considered as lower abrasive layer and a layer or more is/are considered as upper abrasive layer. While the reference teaches layers of abrasive layers (i.e. plurality of abrasives), one or more of said layer(s) is taken to be the lower abrasive layer and one or more of said layer(s) is taken to be the upper abrasive layer(s). It is clear that the top abrasive layer is placed on the top of the lower abrasive layer (limitation of claim 31). With reference to “a top of abrasive layer formed over the surface of the shank is lower than a tope of the lower abrasive layer”, it should be noted that as can be seen in figures, specially Figures 2 and 3, there are plurality of abrasives in the concave portions; since the claims do not make any distinction between the upper and lower layer and since no distinction is being made as where about of the border lines specifying lower and upper layers, the disclosure and figures of Caspani et al. clearly reads on said limitation of claim 32 as well absence evidence showing the contrary.

Claims 16-19, 22-25, and 28-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sung.

Sung teaches a diamond tool which comprises of opening slots (i.e. concave portions) in a support material (i.e. shank) wherein the opening slots are filled with diamond particles and diamond braze (i.e. bonding material) (Abstract; column 14, lines 20-25, 35-40). This structure can be found in Fig. 7A and 7B; as noted the upper end edge is rounded.

With reference to "another plurality of abrasives are formed over the plurality of abrasives bonded into the concave portions and onto the surface of the shank to form multiple abrasive layers" (previous claim 25), it is to be noted that as clearly shown by Sung, multiple layers of abrasives bond to and fill the slots; therefore, there are pluralities of abrasives bonding to the walls of the slots and to each other, on top of each other, to form the slots (i.e. concave portions) filled with abrasives forming the diamond tool absence clear evidence proving the contrary. This is specially true since the claims claim "plurality of abrasives are bonded into the concave portions" and "another plurality of abrasives are formed over the plurality of abrasives..." but does not provide any distinction between these two pluralities of abrasives; therefore, it is the Examiner's position that layers of abrasives (i.e. plurality of abrasives) bonded to each other and to the walls of the slots (i.e. concave portions) on top of each other reads on the new limitation to instant claims. In other words, no distinction is seen to exist between the lower abrasive layer and the upper abrasive layer as recited in instant

claims including claim 30. While the reference discloses layers of plurality of abrasives, some lower layers can be considered as "a lower layer" and the layers on the top of them can be considered as "an upper layer" according to instant claims including claim 30.

Additionally, Sung discloses an embodiment wherein the diamond abrasive particles protrude from the support material (column 15, lines 45-50). Thus, although Sung may not expressly disclose such protrusion for the abrasive particles in the concave portion, the fact that said reference suggests the use of abrasive particles in a way that they protrude from the surface of the support would make it obvious that it would be known to a person or ordinary skill in the art to have obtained a tool with abrasives protruding from its surface; this broadly reads on the new limitation (previous claim 25) added to claims specially claim 16 and claim 30 specially noting that since only the slots contain abrasive particles and since Sung suggests particles protruding from the surface, therefore, it would be expected that the particles contained within the slots may have protrusions as well absence clear and specific evidence showing the contrary.

With reference to the limitations of claim 31, wherein “a top of the upper abrasive layer formed over the surface of the shank is protruded above a top of the lower abrasive layer”, as detailed out above, there is no distinction seen between the lower and upper abrasive layer (i.e. they are not of two different type of abrasives, etc.); therefore, it is taken that a layer or more is/are considered as lower abrasive layer and a layer or more is/are considered as upper abrasive layer. While the reference teaches

layers of abrasive layers (i.e. plurality of abrasives), one or more of said layer(s) is taken to be the lower abrasive layer and one or more of said layer(s) is taken to be the upper abrasive layer(s). It is clear that the tope abrasive layer is placed on the top of the lower abrasive layer (limitation of claim 31).

Furthermore, Sung teaches that the slots or holes can be formed to provide such columns which are linear or which curve in any desired direction (column 16, lines 24-26). Additionally, said diamond tool is used in cutting, drilling, etc. equipment as that has been made obvious by the reference (column 1, lines 5-26; column 16, lines 26-30). Moreover, since the reference discloses the use of diamond particles, this is taken to include any and all types of diamond particles including synthetic and natural (column 16, lines 3-10).

With reference to the ratio of the width of the concave portion to the maximum diameter of abrasive being greater than 0.25 and the ratio of the depth of the concave portion to the maximum diameter of the abrasive being greater than 0.25, it is apparent from Figure 7A and 7B, that said ratios are greater than 0.25 since more than one layer of diamond particles are fit into the slots (i.e. concave portions); thus, the depth of the concave portions is larger than the diameter of the diamond particles. Furthermore, since, taking any layer of diamond particles in the slots, a particle easily fits into a slot; therefore, the width of the concave portion should be greater than that the maximum diameter of the abrasive.

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sung as applied to claim 16 above, in view of U.S. Patent No. 4,091,792 to Farrell.

Sung, as noted above, disclose a diamond tool which comprises of opening slots (i.e. concave portions) in a support material (i.e. shank) wherein the opening slots are filled with diamond particles and diamond braze (i.e. bonding material).

Although Sung may not expressly disclose through-hole within the concave portion, it has been known, and thus, obvious to a person or ordinary skill in the art to have through-holes since they assist in dissipating the heat generated during grinding/abrading work as that evidenced by Farrell (column 1, lines 33-42) as clearly known in the art.

Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sung as applied to claim 16 above, in view of Farrell and U.S. Patent No. 4,624,237 to Inoue.

Sung, as noted above, disclose a diamond tool which comprises of opening slots (i.e. concave portions) in a support material (i.e. shank) wherein the opening slots are filled with diamond particles and diamond braze (i.e. bonding material). Additionally, as shown above, Sung in view of Farrell make it obvious to have through-holes within the concave portions in order to assist in dissipating the heat generated during grinding/abrading work. It should be noted that the concave portion is in the sub-cutting face of the support material (i.e. shank).

Sung or Sung in view of Farrell do not expressly disclose the existence of grooves in a main cutting edge; although Sung makes it obvious that his tool is used in

grinding and cutting, it does not disclose expressly show a structure of said devices with grooves. Nevertheless, formation of grooves onto an abrading wheel would have also been obvious to a person or ordinary skill in the art motivated by the fact that grooves would help in not only dissipating the heat generated by the grinding/abrading work and thus cooling the tool, but also, they provide a passage for the outflow of the abraded particles as that evidenced by Inoue (Abstract and claim 1). In addition, as it is clear from Figures 1 and 3 of Inoue, abrasives are bonded into grooves as well (Figures 1 and 3, Inoue). It is, also, to be noted that "grooves" clearly fall in to "concave" type shapes.

It should be noted that the combination of Sung in view of Farrell discloses that it would be obvious to have through-hole in the shank; with reference to abrasives bonded into the through-hole, it would have been obvious to a person of ordinary skill in the art to have some abrasive bonding with, at least, portions of the walls of the through-hole since while having through-hole in the shank which comprises of abrasives bonded together and to the shank, it would have been obvious that the through-hole cannot avoid contact with the abrasives.

Claims 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sung as applied to claim 16 above, in view of U.S. Patent No. 5,989,405 to Murata et al.

Sung, as noted above, disclose a diamond tool which comprises of opening slots (i.e. concave portions) in a support material (i.e. shank) wherein the opening slots are

filled with diamond particles and diamond braze (i.e. bonding material). Additionally, Sung suggests that the abrasive diamond particles protrude from the surface as shown above.

Murata et al., drawn to a dresser (i.e. abrasive tool) which includes super-abrasives (e.g. diamond), disclose that the super-abrasive particles are protruded from the surface, and, as it's apparent from the figures, the protruding heights are different (Fig. 1 and 2). Murata et al., further, disclose that height of protrusion of particle is 5 to 30% of the average diameter of the particles (column 4, lines 45-60). Additionally, the reference discloses that this height range is the most effective height.

Therefore, it would have been obvious to a person of ordinary skill in the art to modify Sung in order to show abrasive particles protruding at different heights from the surface as that taught by Murata et al. motivated by the fact that this range of height for protrusion of super-abrasive particles in an abrasive tool is the most effective height in abrading work. It is to be noted that based on the teachings of Murata et al. it is found that making the particle protruding from the surface is well within the scope of a skilled artisan. Furthermore, although Murata et al. do not expressly refers to a concave or hole portion on an abrasive layer, Sung, as detailed out above, clearly meets said limitation. Additionally, as obvious from the figures of Murata et al., the super-abrasive particles are protruded at different heights, and therefore, it is well within the scope of a skilled artisan to have modified Sung in order to show protrusions as different heights.

It should be noted that although the Figures provided by Sung may portray abrasive particles protruding at the same height, it is well seen and shown that said

pictures are seen diagrams representing the general and broad teaching of that invention.

Response to Amendment

Applicants' amendment to claim 23, filed August 11, 2009, page 3 is acknowledged. Therefore, the objection made to said claim as presented in the previous Office action is hereby withdrawn.

Applicants' amendments to claims 16 and 21 by inserting the limitation of claim 25 into said claims, filed August 11, 2009, page 2, are acknowledged. However, said amendments do not place the application in condition for allowance.

Response to Arguments

Applicants' arguments with respect to claims 16-24 and 26-32 have been considered but are not persuasive.

Applicants have argued that the references do not disclose "another plurality of abrasives are formed over the plurality of abrasives bonded into the concave portions and onto the surface of the shank to form multiple abrasive layers".

The Examiner, respectfully, submits that as clearly shown by Sung, multiple layers of abrasives bond to and fill the slots; therefore, there are pluralities of abrasives bonding to the walls of the slots and to each other, on top of each other, to form the

slots (i.e. concave portions) filled with abrasives forming the diamond tool absence clear evidence proving the contrary. This is specially true since the claims "plurality of abrasives are bonded into the concave portions" and "another plurality of abrasives are formed over the plurality of abrasives..." but does not provide any distinction between them; therefore, it is the Examiner's position that layers of abrasives (i.e. plurality of abrasives) bonded to each other and to the walls of the slots (i.e. concave portions) on top of each other reads on the new limitation to instant claims.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PEGAH PARVINI whose telephone number is (571)272-2639. The examiner can normally be reached on Monday to Friday 8:00am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on 571-272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Pegah Parvini/
Examiner, Art Unit 1793

/Anthony J Green/
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